Biomedical and Biopharmaceutical Research
Abbreviation: Biomed. Biopharm. Res.
Volume: 21: Issue: 02 |Year: 2024
Page Number: 44-47

A Comparative Analysis of Learning Outcome and Perception of Phase Iii Medical Students Using Three Teaching Learning Methods: Flipped Classroom, Simulation-Based Learning and Lecture cum Demonstration

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Article Received: 22-11-2024

Article Accepted: 11-12-2024

Abstract

Education is a dynamic process that has to be refined periodically. With technological progress, many innovative teaching techniques are available. Lack of incorporating such techniques can make medical education inadequate in making significant strides towards future like CBME as envisioned by NMC for IMG. Flipped classroom, Simulation based teaching and Lecture cum demonstration are advanced teaching methods which, as compared to traditional didactic lectures, increase students' involvement and interest during teaching and promote enhanced learning and critical thinking in students. This ultimately contributes to enhanced competency in the IMG.

KEYWORDS: Teaching-Learning Methods, FC, Lecture cum Demonstration, Simulation-Based Learning.

INTRODUCTION

Lack of innovative teaching techniques with changing times and technological advances makes medical curriculum inadequate in making a significant stride towards the future.[1] In literature, there are many studies showings advantage of modern innovative Teaching Learning Methods (TLMs), but there is no such study conducted in our institute, our setup, so far.

AIM AND OBJECTIVES

Comparative analysis of three TLMs i.e. Simulation Based Learning (SBL), Flipped Classroom (FC) and Lecture cum Demonstration (L&D) in terms of learning outcomes and perception among Phase III MBBS students. The objective is to compare the learning outcomes of students using these three TLMs and to assess the perception of students towards these three TLMs.

MATERIAL AND METHODS

Study Design: Questionnaire based, randomized controlled, educational interventional study using three different TLMs (SBL, FC and L&D).
Inclusion criteria: Voluntary participation and given consent.
Sample size: 90 students of Phase III MBBS, randomly and equally divided into three Groups A (n=30), B(n=30) & C(n=30).

Data collection method: Pre-test Questionnaire including 27 MCQs (16 on CPR &11 on ET) and 11 questions on perception were asked by each group. Then only the practical aspect of two topics i.e. Cardiopulmonary Resuscitation (CPR) & Endotracheal Intubation (ET) were taught to every TLM group i.e. Group A by SBL; Group B by FC and Group C by L&D. After the educational intervention, a Post-test Questions containing 27 MCQs (16 on CPR & 11 on ET and different from pre-test), 11 perception questions (same as pre-test) were asked to each group. Students' learning outcome was assessed through 8 OSCE stations (Total-40 marks: CPR:ET- 3:5 stations i.e. CPR-15 & ET-25 marks).
Statistical analysis: Quantitative & Qualitative analysis was done using Microsoft Excel and calculation of mean, standard deviation, Z test, ANOVA test and percentage. Normally distributed data of post-test was subjected to ANOVA test to determine the significance.

RESULTS:
The results showed statistically significant higher marks among Group B (FC) compared to group A (SBL) and C (L&D).[2]

Table1: Pre-test and Post-test comparison for TOPIC-1(CPR)

		Pre-test	Post-test	Z-score	P-value
Group A (SBL)	Mean	3.83	5.63	5.29	<0.05
	SD	1.76	0.80		
Group B (Flipped Classroom)	Mean	4.06	13.23	17.63	<0.05
	SD	0.98	2.78		
Group C (L&D)	Mean	2.46	5.03	8.56	<0.05
	SD	1.40	1.03		

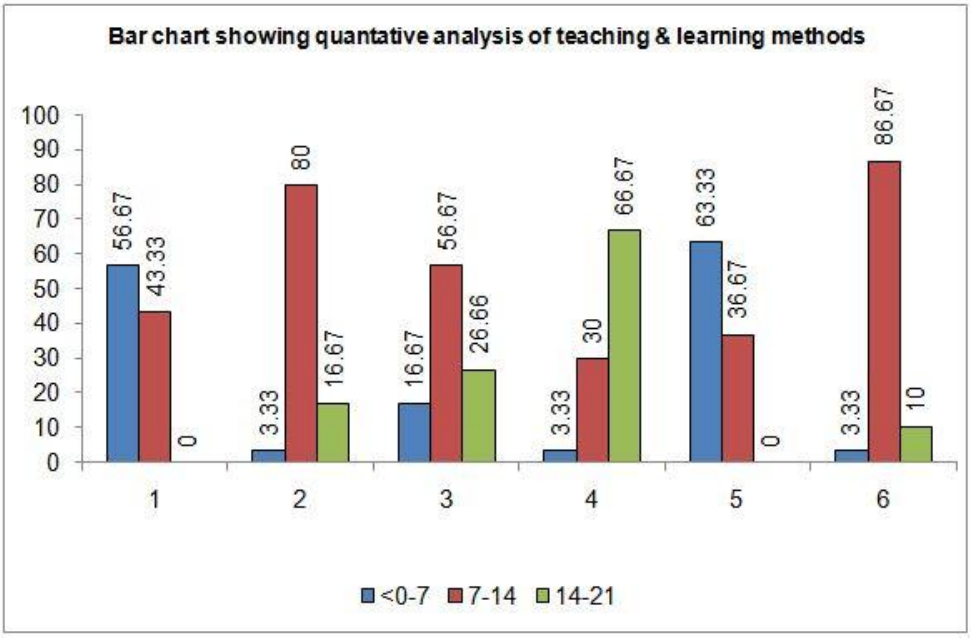
Table 2: Pre-test and Post-test comparison for TOPIC-2 (ET)

		Pre-test	Post-test	Z-score	P-value
Group A (SBL)	Mean	3.3	4.5	2.72	<0.05
	SD	1.91	1.61		
Group B (Flipped Classroom)	Mean	1.06	9.1	11.72	<0.05
	SD	0.98	2.21		
Group C (L&D)	Mean	2.46	5.90	9.29	<0.05
	SD	1.40	1.58		

Table 3: OSCE score comparison among all three TLMs

	TOPIC-1(CPR)				TOPIC-2(ET)			
	Mean	SD	F value	P value	Mean	SD	F value	P value
Group A (SBL)	8.63	3.22	11.77	0.00001	15.35	7.01	5.95	0.003
Group B (Flipped Classroom)	11	1.62			19.26	4.08		
Group C (L&D)	7.95	2.57			14.36	5.97		

Figure 1: Comparison of difference in proportion for High, medium & low scores in pre &post-test MCQs of Group A, B and C (n=90)



In group B (Flipped Classroom Method) post-test mean OSCE score was higher than group A (SBL) and C (L&D), this shows better effectiveness in terms of learning outcome in comparison to other TLMs. In group B (FC), there was low score of only 16.67% in pre-test and 3.3% in post-test, which is far lower than group A (SBL) and C (L&D). Higher scores significantly improved from 26.66% to 66.67% in group B (FC) which is far better than group A (SBL) and C (L&D). In almost all the 11 questions for Flipped Classroom, percentage of students who agreed & strongly agreed were far more (for question no 4 being highest at>90%) than those who disagreed in comparison to other TLMs.

DISCUSSION

The Pre-test and Post-test comparison for both the topics in all the three groups I.e. in all the three T-L method groups, showed significant difference statistically. This means there was improvement and enhancement of learning and competence by the modern T-L methods: Flipped classroom, Simulation best learning and Lecture cum Demonstration. Also it was noteworthy that the Post-test scores among the three TL methods were highest for Flipped classroom method for both the topics. Comparison of the OSCE scores after the 3 T-L methods showed highest score in the group taught by Flipped classroom method for both the topics. Qualitative analysis of the feedback forms by the students suggested that maximum number of students - 79.23% suggested that Flipped classroom method was found better and preferred by them. Several studies are there who have used various similar interactive methods for teaching which I have discussed here with comparison to similar study done previously. **Lamia A.**[3] et al study was conducted in faculty of nursing at Fayoum University. Subjects: A total number of students 140 students were enrolled in this study, both sex studies at second semester, fourth year during study of community health nursing course, academic year 2016/2017. data was collected through self-administer questionnaire sheet which include personal characteristics, students engagement scale: satisfaction scale and achievement questionnaire sheet. Around three quartets (71.4%) of student undergoing flipped classroom as a teaching strategy achieved a moderate level of achievement compared with half (50%) of student undergoing lecture based learning (post test).There were highly statistical significant between pre and post-test of study and control group regarding student satisfaction and engagement. In **Susan M.**[4]et al study of 182 eligible PGY-2 residents, 169 (93%) consented to participate, 155 (85%) participated in the entire intervention, and 142 (78%; n ¼ 83 for flipped classroom; n ¼ 59 for traditional lecture) completed all 3 knowledge tests. The flipped classroom group (n ¼ 82) also completed both pre-test and post-test surveys of their perceptions of this learning model.. Of 182 eligible postgraduate year 2 anaesthesiology residents, 155 (85%) participated in the entire intervention, and 142 (78%) completed all tests. The flipped classroom approach improved knowledge retention after 4 months, and

residents preferred the flipped classroom. Conclusions The flipped classroom approach to didactic education resulted in a small improvement in knowledge retention and was preferred by anaesthesiology residents.

CONCLUSION

Current evidence suggests that the flipped classroom approach in health professions education overall yields a statistically significant improvement in learner performance compared with traditional teaching methods(for the specific topics).

IMPLICATIONS

Results obtained from this study can be supplemented or alternatively used in our institute over traditional teaching for promoting effective learning and competency through active student participation for CBME as envisioned by NMC.

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